An Army Learning Model implementation: Challenges, successes, future directions

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ABSTRACT

The Army Learning Model (ALM) focuses on developing Soldiers over time using a variety of "Soldier-centered" methods in a range of settings that foster 21st Century Soldier Competencies (e.g., initiative, critical thinking). Such competencies are critical for enabling a high degree of operational effectiveness in the context of Unified Action/Full Spectrum Operations. Achieving the ALM's vision requires changes to Army training including instructional approaches and technology applications. Accordingly, one instructional approach suggested in response to this challenge is "Adaptive Soldier and Leader Training and Education" (ASLTE). The ASLTE approach, rooted in Outcomes Based Training and Education, promotes instructional principles focused on developing desired leader competencies through instructor-student interactions over time. It requires that instructors (1) possess a reasonable level of expertise and leverage their capability to adapt to new challenges, (2) are capable of maintaining a positive attitude conducive to building trust and confidence in their students, and (3) purposefully and systematically move student learning activity towards a threshold of failure to challenge them while ensuring success to build confidence and initiative. This paper discusses the theoretical basis of the ASLTE approach and findings concerning successes, challenges, and opportunities based on observations during various applications (i.e., marksmanship training in Initial Entry Training, the Army Reconnaissance Course, and the Infantry Advanced Leader Course). Additionally, we summarize workshop findings from a cross section of courses and organizations at Ft. Benning regarding challenges and best practices. Collectively, these analyses indicated that much progress has been made in implementation and ASLTE holds great promise, but key challenges remain. We propose recommendations for further ASLTE implementation focused on issues including but not limited to instructor development (e.g., building expertise), instructional methods (e.g., scaffolding techniques), and reliable assessment of competencies across and within courses (e.g., methods to consistently assess leader attributes such as initiative).

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INTRODUCTION

Like other complex organizations, the United States Army needs adaptable professionals who solve complex problems and exercise sound judgment to successfully complete missions in high-risk, high-consequence environments. Indeed, the Army Learning Model (ALM, Department of the Army, 2011) focuses on developing Soldiers over time using a variety of "Soldier-centered" methods in a range of settings that foster 21st Century Soldier Competencies (21st CSC, henceforth) shown in Table 1. Such competencies are critical for enabling a high degree of operational effectiveness in the context of Unified Action/Full Spectrum Operations. Achieving the ALM's vision requires changes to Army training including instructional approaches and technology applications.

Table 1. 21st Century Soldier Competencies.

21st Century Soldier Competencies
Character and accountability
Comprehensive fitness
Adaptability and initiative
Lifelong learner
Teamwork and collaboration
Communication and engagement (oral, written, negotiation)
Critical thinking and problem solving
Cultural, Joint, Interagency, Intergovernmental, and Multinational

To date, the U.S. Army's Asymmetric Warfare Group's (AWG) Adaptive Soldier Leader Training and Education (ASLTE) program is the only instructional approach that has been widely advanced across the Army to apply the ALM requirement to develop 21st CSC. The approach is designed to deliberately develop "intangible" student skills and attributes, e.g., problem solving and critical thinking, confidence and initiative, in the context of tactical and technical skills. Critically, the U.S. Army's Training and Doctrine Command (TRADOC) is currently supporting the AWG in its quest to train instructors and leaders on how to implement ASLTE across the Army starting with institutional training courses such as the Advanced Leader Course (ALC) and the Army Reconnaissance Course (ARC) at Ft. Benning.

The ASLTE approach, rooted in Outcomes Based Training and Education (OBTE; Riccio, Diedrich, & Cortes, 2010), promotes instructional principles that develop desired leader competencies through instructor-student interactions over time. It requires that instructors (1) possess a reasonable level of expertise and leverage their capability to adapt to new challenges, (2) are capable of maintaining a positive attitude conducive to building trust and confidence in their students, and (3) purposefully and systematically move student learning activity towards a threshold of failure to challenge them while ensuring success to build confidence and initiative.

Given the importance of this approach for the Army in realization of the ALM, the following sections discuss the theoretical basis of the ASLTE approach and initial findings concerning successes, challenges, and opportunities based on observations during various applications (i.e., marksmanship training in Army Initial Entry Training, IET, the ARC, and the Infantry ALC). Additionally, we summarize workshop findings from a cross section of courses and organizations at Ft. Benning regarding challenges and best practices. Collectively, these analyses indicated that much progress has been made in implementation and ASLTE holds great promise, but key challenges remain. We

propose recommendations for further ASLTE implementation focused on issues including instructor development (e.g., building expertise), instructional methods (e.g., scaffolding techniques), and reliable assessment of competencies within and across courses (e.g., methods to consistently assess leader attributes such as initiative).

THE ASLTE APPROACH

ASLTE was born out of a need to develop leaders who are able to solve complex problems and exercise sound judgment to successfully complete missions in high-risk, high-consequence environments. This implies going beyond training tactical and technical (i.e., procedural) skills to training cognitive skills and other attributes such as confidence and initiative. While the ASLTE approach has only been formalized within the Army in the past decade, building on OBTE, its focus on developing cognitive skills and other key leader attributes builds on strong academic tradition. In fact, such skills and attributes have long been considered critical in developing effective leaders and expertise.

The "Great Man" theory by Thomas Carlyle (1841; as cited in Zaccaro, LaPort, & Jose, 2012) refers to unique qualities and attributes possessed by effective leaders. Many of those identified map directly to many of the 21st CSC, e.g. communication and engagement (oral, written, negotiation), critical thinking and problem solving, adaptability and initiative. For example, Zaccaro et al. refer to complex problem solving skills, intelligence and reasoning skills, communication and negotiation skills, and cognitive and behavioral flexibility as key attributes of effective leaders.

Research in developing expertise, or consistent superior performance on tasks within a specific domain (Ericsson & Smith, 1991), also supports the development of the types of competencies on which ASLTE and the ALM are focused. Individuals who are expert in a domain compile knowledge into integrated chunks that can be retrieved (e.g., Anderson, 1983) to support automatic and efficient performance (Fitts & Posner, 1967). Adaptive expertise (Holyoak, 1991) occurs when individuals are able to perform a specific task within a domain successfully even when the task changes. Individuals who possess adaptive expertise can abstract new methods for accomplishing tasks by drawing on their deep knowledge base. Smith, Ford, and Kozlowski (1997) suggest that developing (1) detailed knowledge structures about a task and a domain; and (2) metacognition are required to develop adaptive expertise. The former provides the foundation for the ability to adapt under changing circumstances and the latter facilitates effective performance in novel situations, e.g., the ability to recognize and learn new patterns as well as evaluate one's own performance in that situation. Both components can be tied to many of the 21st CSC. Likewise, both components highlight the importance of competencies based on procedural and declarative knowledge (e.g., tactical and technical competence; cultural, joint, interagency; intergovernmental, and multinational competence) and those driven by cognitive and affective skills (e.g., character and accountability; lifelong learner).

ASLTE principles

From its inception, ASLTE recognized the criticality of all 21st CSC in developing effective leaders and that many if not all of them are tightly coupled. The challenge has been how to best realize these objectives from an instructional design perspective. A critical insight, and one that has become a key assumption in ASLTE, is that in any training event, students learn more than just the intended training content: they learn entire experiences. As Dewey (1938) noted, "Perhaps the greatest of all pedagogical fallacies is the notion that a person learns only the particular thing he is studying at the time. Collateral learning in the way of formation of enduring attitudes, of likes and dislikes, may be and often is much more important than the spelling lesson or lesson in geography…" Indeed, what students learn is shaped by the environment, the people, interactions that occur, and associated emotions. These experiences are what underlie the full training outcomes, thereby profoundly influencing the development of an individual over time. The fundamental premise of ASLTE is that a Soldier's entire experience during a training event, not just the domain content, shapes the type of Soldier that he or she becomes – and this entire experience can and must be managed. Managing these experiences does not argue against traditional standards, and indeed, meeting and exceeding standards remains critical. Rather, ASLTE focuses on managing the learning conditions more broadly in a way that fosters development of the full range of 21st CSC.

Key to the OBTE approach, and hence ASLTE, is the concept of the Zone of Proximal Development (ZPD), which is defined as the space or difference between the student's current unaided ability and the student's ability with instructional guidance (Vygotsky, 1978). As learning progresses, the locus of the zone changes, and to the extent

that the student maintains position at the zone's edge and can access external guidance as needed, learning will be efficiently affected. In practice, this means that to accomplish ASLTE, instructors must hold the student at the edge of failure – where they are challenged – while promoting success that builds confidence and initiative. By skillful management of the ZPD, including scaffolding strategies and formative feedback, the student learns that while she might face formidable challenges, the instructor is someone who can be trusted to promote success and tolerate measured failure. Establishment of trust between the Soldier and instructor is critical, for without it, Soldiers will be unlikely to take the risks that promote growth, confidence, and accountability through success. Hence, management of the learning conditions to leverage the ZPD to ensure success with challenge is the core of ASLTE and more generally, effective development of 21st CSC.

More specifically, ASLTE promotes principles focused on developing both "intangible" leader attributes and tactical and technical skills (Table 2; AWG, Unpublished Course Workbook). To realize these principles, ASLTE leverages the following high-level learning strategies: (1) focusing on mastery of desired skills and competencies versus adhering to throughput-driven requirements alone; (2) systematically escalating stress during training; (3) creating opportunities for problem solving versus telling/lecturing alone; (4) trusting and empowering students to be responsible for safety and learning; and (5) ensuring instructor-student interactions convey purpose and intent (operational context). First, by focusing on mastery, the goal of ASLTE is to ensure that Soldiers can execute essential skills. Second, by systematically escalating stress during training while emphasizing mastery, the approach aims to develop confidence and initiative in students through successful management of learning conditions to leverage the ZPD. For example, one might challenge a student to plan simple aspects of missions first while gradually adding complexities in terms of terrain, enemy, etc. Third, the approach focuses on creating opportunities for problem solving to emphasize discovery of solutions, while de-emphasizing rote memorization and stimulus-response conditioning. The concept, rooted in elements of problem-based learning (e.g., Savory & Duffy, 1995) is to provide many opportunities to practice solving problems to ultimately foster the adoption of problem solving as a habit. Critical to note is that there is indeed "a time for telling" (e.g., lecturing) along with problem solving to ensure that correct solutions are conveyed (e.g., Schwartz & Bransford, 1998), but the emphasis is on allowing opportunities for problem solving to be far greater than in traditional Army training. Fourth, trusting and empowering students serves as a foundation from which to develop a positive rapport between students and instructors, foster trust and responsibility in Soldiers, and to develop student assumption of accountability. Finally, ensuring that instructor interactions with Soldiers are focused on conveying purpose and intent of tasks (i.e., the "why" behind the "what") is designed to enable adaptability.

Table 2. Principles promoted by the ASLTE approach

ASLTE principles
Grow problem solving skills
Increase intangibles
Increase understanding and awareness
Increase deliberate thought
Improve combat performance

EXAMPLE APPLICATIONS OF ASLTE

In this section, we illustrate the application of ASLTE more thoroughly by exploring several applications in various Programs of Instruction (POI), including marksmanship in Army IET, the ARC, and the Army Infantry ALC. Likewise we summarize findings from a workshop conducted with training developers and managers to identify challenges associated with ASLTE application more generally. Through these findings, we illustrate application of ASLTE while uncovering the challenges that remain for full implementation of the approach with the Army.

Marksmanship in Initial Entry Training

Early on in the evolution of ASLTE, the AWG focused on Initial Entry Training (IET) for early application of OBTE given the formative nature of those experiences in Soldier development. Indeed, as part of IET, rifle marksmanship is a fundamental Soldier skill, and accordingly, marksmanship training has historically been a critical priority as well as challenge for both new Soldiers and their Drill Sergeants. Marksmanship is a fundamental skill of the Soldier and, while it is not the most sophisticated skill, it is a specialized task with many graduated levels of complexity; necessitating a systematic approach to instruction, learning and mastery that has the potential to grow intangible skills through technical competence.

As part of IET, Basic Rifle Marksmanship instruction (BRM) is based on a decomposition of the task, breaking execution down to its fundamentals (body position, breathing, trigger pull and site picture), to allow Soldiers to grasp basic concepts and integrate these building blocks to achieve mastery of the whole skill. Instruction is

intended to be executed in this way, and unfolds over several days. But, while this process is generally effective, a challenging student / instructor ratio and demanding timetable can negatively affect the totality of what is learned. For instance, due to throughput concerns (i.e., getting the Soldiers to meet standard in specified time), some Soldiers are pushed beyond their ZPD with negative consequences. For instance, mastery at early stages may be compromised (e.g., during grouping), leading to continued challenges as instruction progresses (e.g. through zeroing). The net effect can be decreases in confidence when the new Soldier struggles to achieve success. In this manner, while the task may be learned, depending on the path taken to meet the objective, collateral effects on confidence and initiatives can negatively affect overall Soldier development with respect to ALM objectives.

Given these challenges, and the importance of marksmanship, it was the first in a series of courses that were re-designed by the AWG to pilot the OBTE approach. The pilot course was a train-the-trainer course aimed at training Drill Sergeants an advanced rifle marksmanship course using the OBTE / ASLTE approach. Essentially, the course was an advanced marksmanship course (Combat applications Training Course; CATC) designed to demonstrate to Drill Sergeants how to train Soldier tasks using the OBTE / ASLTE approach using marksmanship as the venue. Following participation in CATC, Drill Sergeants then had to apply lessons learned to their own instruction in BRM, which was the focus of our observations (for complete results, see Riccio, Diedrich, & Cortes, 2010).

Methods. Three IET companies at three posts at different stages of Basic and Advanced Rifle Marksmanship (ARM) participated in the study. At one post, observations occurred before and after Drill Sergeants attended CATC. Scientists who were trained on marksmanship observed instructor and student interactions and provided ratings of behaviors that were linked to instructors' application of OBTE principles and their communication towards Soldiers (Drill Sergeant performance), the IET Soldier's performance (Student BRM performance), and execution of OBTE principles (OBTE principles).

Key findings. Drill Sergeant performance, Soldier performance, and communication significantly improved after CATC. As Drill Sergeants changed their behaviors to be more positive, so did the Soldiers (OBTE principles). In terms of communication, both Drill Sergeants and Soldiers asked more questions and increased communication overall. Despite these results, both Drill Sergeant and Private scores did not increase much beyond intermediate levels (3 out of 5; Mean = 2.60; Minimum score = 1.91; Maximum score = 3.40) on average. A full account of the results is available in Riccio, Diedrich, and Cortes (2009).

Lessons Learned. Despite this overall success, however, several challenges remained for full implementation of the instructional approach, including a range of factors such as improved linking of isolated tasks to larger contexts to promote understanding and also ways to better manage increasing stress to manage the ZPD of the Soldiers. Critically, related to this later point, and as noted above, one key obstacle remained: management of throughput given training schedules and instructor/student ratios. While some Soldiers succeeded, other Soldiers still had difficulty achieving mastery while in limited times for instruction and with limited instructor contact. While there was generally an observable trend towards Drill Sergeants working to increase understanding of the task and facilitating development of intangible attributes (e.g., confidence, decision making, accountability, initiative) at the beginning of the training event, or day, emphasis on problem solving was sometimes tabled as the numbers of struggling, or yet to be tested Soldiers remained steady while available time waned. Against the clock and without a deep enough understanding of how to fully enable a Soldier to take ownership of the task, many Drill Sergeants focused on task execution and direct instructional techniques at the expense of time for problem solving. So, while an initial overall success, these data suggested that a fundamental challenge to the instructional approach is how to manage time for Soldier-centered learning while still achieving overall time and throughput requirements. Additional interventions are required to enable additional student contact time, self-development applications for Soldiers who are struggling, and more effective use of augmentation to the instructor cadre (e.g., peer coaches).

The Army Reconnaissance Course

Three years after the initial application of CATC for marksmanship training in 2006, the ARC was redesigned to integrate OBTE, formalizing many of the ASLTE elements as it is currently known. Today, the ARC still represents one example of the ALM, as it aims to specifically develop confident and agile Soldiers who can operate under unpredictable combat and training situations. Specifically, along with technical and tactical reconnaissance skills, the ARC aims to develop these leader attributes: accountability, adaptability, anticipation, confidence, initiative, problem solving, and risk mitigation in its students. The focus of our work with the ARC is on developing measures that will enable consistent and reliable assessment of those intangible attributes across both instructors and students.

As is often the case, leader attributes are less well-defined than tactical and technical skills and are therefore more difficult to assess. For example, instructors can easily assess how accurately students measure the width, depth and velocity of a river that must be crossed during a patrol or mission, but have difficulty in accurately and consistently assessing the confidence or problem solving skills of students while assessing the feasibility of that route. The challenge is therefore to ensure that instructors are able to accurately and consistently assess both tactical and technical skills and intangible leader attributes. Training assessments provide a critical mechanism for tailoring instruction to the learner's needs and realizing TRADOC's vision of a Soldier-centered learning environment.

Methods. To aid the instructors in the assessment of intangible leader attributes, we leveraged Aptima's COmpetency-based Measures for Performance ASsessment Systems (COMPASS^{SM}) methodology, which is an approach to developing valid, reliable and sensitive measures of team and individual performance. COMPASS employs an iterative series of three workshops with subject matter experts (SMEs) to develop and initially validate performance measures. The purpose of the workshops is to obtain specific behavioral indicators for each leader attribute (i.e., visibly observable behaviors linked to leader attributes).

In *Workshop 1*, seven instructors provided information about the behaviors they look for to assess each leader attribute. Instructors were asked to verbally describe those behaviors within the context of three training events (Planning, Bridge Reconnaissance, and Patrolling) and also specify *Excellent*, *Average*, and *Poor* behaviors. The workshop resulted in a list of behavioral indicators for each attribute categorized from novice to expert and an ordering of those behaviors based on the difficulty of the associated tasks. Following the workshop, behavioral indicators for each leader attribute during the three training events were synthesized by extracting common indicators within each attribute and across events. Those indicators were then developed into statements that would allow instructors to simply indicate whether or not they observed that specific behavior in a student.

Workshop 2 focused on the completeness of the measures, reducing redundancy, and obtaining input on the order of the behavioral statements to inform how they should be grouped. The workshop resulted in wording changes and deletions of redundant statements. Behavioral statements were eventually used to develop a single measure for each leader attribute. The scale for each measure was set to the one used in the course (i.e., -2 to +2) based on the instructors' recommendations (see Figure 1). Finally, in *Workshop 3*, leader attribute measures were reviewed with three to five instructors for completeness and clarity. Measures and associated behavioral statements were finalized during that workshop.

Key findings. This rigorous development process resulted in measures for each leader attribute, with behavioral statements categorized on a scale from -2 to +2 for each measure. An example measure for *Accountability* is shown in Figure 1. Behavioral statements or anchors were designed to help instructors (1) key in on critical behaviors that represent each attribute, and (2) assess those attributes consistently across students and other instructors.

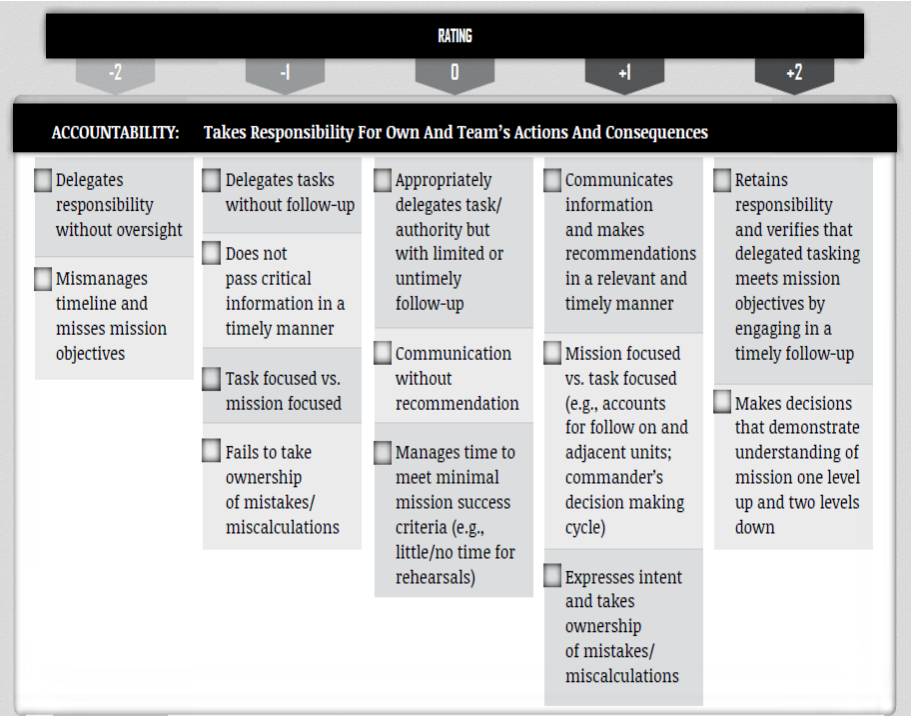

Figure 1. Example leader attribute (Accountability) measure for the ARC.

Lessons learned. The method used in this work exhibits one process required to develop measures of intangible attributes to help instructors assess those attributes in

addition to standard performance. Both types of assessments are necessary to enable instructors to (a) create developmental experiences that are more accurately tailored to each student's strengths and weaknesses and (b) develop intangible leader attributes along with tactical and technical skills. A key lesson learned in this work is that the development of assessments of "intangible" leader attributes requires both time and personnel. It is clear that implementation of ASLTE across the Army continues to progress through the development and incorporation of assessments for "intangible" attributes into POIs such as the ARC. However, the challenge related to resourcing and seamlessly incorporating these types of measures across the Army remains.

The Infantry Advanced Leader Course

The Infantry (i.e., Military Occupation Specialty [MOS] 11B) ALC is designed to train Sergeants and Staff Sergeants on how to lead a Squad or Section in a tactical environment. Our tasks in working with the ALC were to help the instructor cadre re-design the course to incorporate a training approach that will (1) train 21st CSC in Squad Leaders, (2) train Squad Leaders how to develop those same competencies in their subordinates. Likewise, our task included a demonstration of the training approach to the instructor cadre.

Given the task, we worked with ALC to develop modules within their POI that applied the ASLTE approach. As described above, ASLTE promotes instructional practices that focus on instructor-student interactions in the context of (1) leadership and enculturation of Soldiers; (2) Soldier motivation and self-determination consistent with military order; (3) integrated understanding of basic Soldier skills; and (4) collaborative reflection and problem solving (Riccio, et al., 2010). The requirement to integrate the approach into ALC stems from the fact that ASLTE is consistent with the ALM 2015 approach in which the instructor "encourages student participation and puts the instructor in the role of a facilitator. Facilitators are responsible for enabling group discovery. Students and facilitators construct knowledge by sharing prior knowledge and experiences, and examining what does and does not work. The collaborative adult learning environment is nonthreatening; mistakes can be made as students weigh courses of action and as the facilitator guides the group to recognize better solutions" (Department of the Army, 2011, p. 19). Given its novelty and focus on the student-instructor relationship, it was critical to train the cadre both domain and pedagogical content knowledge using both didactic and experiential training methods that include expert demonstrations of the approach.

Methods. The team (Army Research Institute, Aptima, Sophia Speira) worked closely with AWG representatives to coordinate our efforts in helping ALC leadership integrate ASLTE into their POI and training approach. The instructor cadre first completed the AWGs ASLTE workshop in which they learned about the approach, its principles, and some example applications to different activities such as portions of a Leaders Reaction Course and problem solving events associated with a tactical rope-bridge crossing. A week after the cadre completed the ASLTE workshop, we demonstrated the approach to the ALC cadre using land navigation as the venue. The demonstration included both classroom didactic instruction and experiential components as well as discussion throughout the four-day course. The instructors who participated in the demonstration/cadre training event were asked to complete a self-assessment questionnaire on intangible attributes at the end of the first and last day of the event. The questionnaire was developed with instructors and developers of the Army Basic Instructor Course at Ft. Sill, OK, which was revised to apply ASLTE (OBTE at that time; Riccio, Diedrich & Cortes, 2009). The questionnaire which uses a scale from 1 (novice) to 5 (expert) was piloted during the evaluation of that course.

Four weeks after the demonstration, the team returned to assess progress in ASLTE application and provide coaching as necessary. Another six weeks later, the team returned for final observations during which the cadre piloted two modules, Patrolling and Forward Observer Procedures, which they revised to incorporate ASLTE.

Key findings. Given that only eight instructors participated in the demonstration / training course, data from self-assessments were only analyzed for trends. Generally, ratings of variables related to intangible attributes increased (See Figure 2), but ranged only between 3 and 5 suggesting relatively small changes. Nevertheless, these data suggested that when experiencing ASLTE methods themselves in a train-the-trainer setting, these instructors perceived positive changes associated with the method.

During the first follow up, in order to assess cadre application of lessons learned from the train-the-trainer session, the team observed the first iteration of ALC since the Land Navigation training. At that time, the cadre began to implement changes that were consistent with the ASALTE/ALM. For example, the cadre asked students to think

beyond the current task of shooting a machine gun to applications of skills learned in that task to other tasks, e.g., what are barriers to communication while firing a machine gun and how do they apply to other tasks.

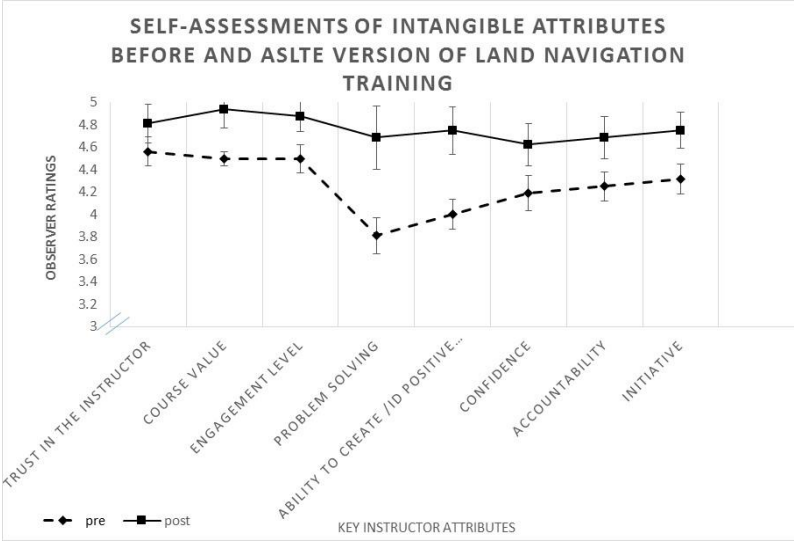

Figure 2. Self-assessments pre and post ASLTE demonstration/training event. Variables assessed were: (1) extent to which student trusted the instructor; (2) perceived value of the course; (3) engagement level; (4) ability to create/identify positive learning environments; (5) confidence; (6) accountability; (7) initiative.

During the final follow up, the cadre piloted two of their revised modules which were designed to incorporate a classroom portion and application of concepts learned in practical exercise. In both cases, the classroom portion kicked off the module. The instructors began the course by immediately engaging the class (which consisted of the team and other instructors) through questions about scenarios that students encountered while deployed. The scenarios described by the students were then subsequently used as examples to clarify concepts throughout the module. For example, one scenario involved calling for fire support during a reconnaissance mission in which enemy insurgents were spotted on a hilltop. Given the scenario, the class discussed the doctrinal terms used, the requirements for the mission, and more importantly, why each of the requirements was important. Additionally, to test the effectiveness of the new approach in teaching Forward Observer Procedures, a scientist on the team took the exam that students take at the end of the module. Given the scientist's limited knowledge and experience with the procedures, the cadre saw it as an opportunity to truly test the effectiveness of the approach in teaching students new knowledge and skills. However, the exam focused on assessing only tactical and technical competencies. Assessment of "intangible" competencies was absent.

During that final visit, the team discussed the assessment of intangible attributes which, similar to ARC, emerged as a major road block for the cadre. Their concerns were that (1) those attributes are difficult to assess; and (2) if exams are geared towards assessing only tactical and technical competencies, then instructors will likely focus a bulk of the course on those competencies (e.g., correct doctrinal terms) and ignore others (e.g., problem solving) due to time constraints. Note that this concern is in line with the results of the IET application where the key challenge for Drill Sergeants was the management of throughput given training schedules and instructor/student ratios.

Lessons Learned. In general, several characteristic of ASLTE were apparent in the newly revised modules. First, the instructor asked questions to lead the students to realize the answers. Second, instructors used creative ways to explain concepts (e.g., other students were used to demonstrate the importance of providing a target location from the caller's perspective instead of the fire support team's perspective). Third, instructors included experiential components in both modules to help reinforce concepts learned during discussions and didactic instruction (e.g., for the Patrolling module, students were required to rehearse scenarios in the field, and for the Forward Observer Procedures module, the students practiced concepts learned by calling for fire using a map and tokens as tools). Last, but not least, instructors remained positive and encouraged questions throughout the class.

Overall, results of the instructor development workshop were positive. Key findings from this work indicated that several exposures to the approach are critical for instructors to be able to apply the approach and that assessment of intangible attributes is a challenge. This suggests that instructor development across the force should include training instructors on how to assess intangible attributes and adjust their instructional strategy to student needs.

ASLTE WORKSHOP

By early 2014, several efforts within several training venues at the Maneuver Center of Excellence (MCoE) at Ft. Benning, GA were in the process of integrating ASLTE into existing institutional POIs. Some, e.g., the ARC, were

well along in their implementation, while others, e.g., the Maneuver Senior Leaders Course, were just beginning. Given varying stages of implementation across the MCoE and that MCoE instructors and training developers had been exposed to ASLTE under varying conditions, the authors organized a workshop to gain a better understanding of the state of various efforts and discuss next steps and future directions. Specifically, the workshop's intent was to bring together MCoE instructors, training developers, and training managers to "compare notes" on progress, share any emerging best practices, and identify common constraints or barriers to implementation. Four problem areas were discussed: (1) how to assess learning and performance under ASLTE, (2) methods and challenges in preparing trainers to apply ASLTE, (3) current strategies and remaining challenges for implementing ASLTE, and (4) strategies for long-term sustainment of ASLTE. The results for each area are outlined below.

Assessment under ASLTE

For ASLTE to be generally accepted, it must result in learning or performance that is at least equivalent, and preferably superior, to current Army instruction. Thus, trainers must be able to empirically assess the effect of executing the approach. This challenge is exacerbated by the fact that incorporation of ASLTE principles is intended to inculcate additional, intangible outcomes not addressed by current training, so that devising "apples-to-apples" comparisons becomes problematic. This issue is highlighted in the ARC and ALC examples. Workshop participants agreed that assessment continues to be a challenge. Evaluation of intangible attributes that are part of the 21st CSC via devices such as a rubric were seen as beneficial, but shared understanding of the devices' construction or in their integration appears to be absent. Consistency of assessment emerged as a major challenge, especially when an intangible attribute may be assessed across otherwise unrelated courses of instruction. Participants agreed the best course of action may be to continue to monitor existing ASLTE efforts and to capitalize on any emerging best candidates for assessment.

Preparing trainers to use ASLTE

Critical to the success of ASLTE is the instructor's ability to employ ASLTE principles during instruction. Participants agreed that the Army instructor preparation process currently does not sufficiently prepare trainers to apply ASLTE. A recommendation was that ASLTE concepts be tied to principles of mission command. Other recommendations included engaging trainers in the development of ASLTE assessment and providing them models of ASLTE instructional techniques. Instructor modeling should include training instructors on when and how to incorporate elements of ASLTE into various instructional methods. Where possible, two of the instructor selection criteria should be a willingness to empower students and a passion for instilling the 21st CSC.

Implementation strategies and challenges

All participants noted the critical necessity to obtain training management's support for ASLTE to be successfully implemented. This is recognized as somewhat of a bootstrapping process, since training management is (rightfully so) reluctant to invest development effort in a process that, as indicated above, has not unequivocally demonstrated itself to result in superior instruction. Part of this reluctance arises from the current shortage of training development personnel – managers must insure day to day training development activities are covered before committing assets to new training development. Participants recommended that the ASLTE approach be related to existing, familiar strategies, and that a reasonable long-range implementation plan be put in place with semi-annual progress reviews.

Long-term ASLTE sustainment

Participants agreed that the ASLTE effort has not reached a self-sustaining state, and that there will for some time be a need for active support. Currently, that active support consists primarily of training (and some re-training) of instructors and training developers. Also, there must be a continuing effort to obtain and maintain training managers' and commanders' buy-in, e.g., including overviews of ASLTE in managers' and commanders' orientation training. Participants recommended that ASLTE trainers themselves sustain the effort through an *ad hoc* local community of practice and that local quality assurance personnel be trained specifically to evaluate ASLTE instruction. Participants also recommended regular and periodic meetings of ASLTE trainers and developers, both as a sustainment measure and as a forum for shared awareness as ASLTE is implemented.

OVERALL CONCLUSIONS/CHALLENGES FOR WAY AHEAD

The ASLTE approach is slowly being integrated in institutional training courses under the MCoE with the support of TRADOC. Several of those courses have applied the approach with different levels of success, but it is still in the beginnings of widespread use and acceptance. First, as seen with the IET implementation, *throughput* remains a

challenge mainly due to time and instructional approach. Typically, courses must train a certain number of students in a short period of time. As a result, the POIs are designed to "teach to the test" by focusing more on teaching procedural and declarative knowledge required to pass the test and less on intangible attributes that are key elements of the 21st CSC. Second, *assessment* is also still a key challenge. Based on our work with the ARC, while assessment of "intangible" competencies is increasingly discussed, development and use of these assessments remain challenging. Moreover, as we learned in the ASLTE workshop, assessment of ASLTE effectiveness is a key challenge. While existing data (IET and ALC described above) point to the benefits of the approach, those studies need to be replicated and extended to show changes in retention rates and transfer. Third, instructor development remains a key challenge. Our work with the ARC and ALC stressed the importance of instructor training on the general ASLTE approach and the use of assessment tools and strategies to guide instruction and student development. Ideally, such programs should be integrated throughout the careers of instructors.

Key findings from the ASLTE workshop echoed the challenges observed in our work with the IET, ARC, and ALC. Also, challenges with implementation strategies and long-term sustainment were highlighted. In response, participants recommended the following: (1) capitalizing on emerging best practices and tools for assessment, (2) engaging trainers in the development of ASLTE assessment; (3) providing trainers models of ASLTE instructional techniques including when and how to incorporate elements of ASLTE into various instructional methods, (4) including willingness to empower students and a passion for instilling the 21st CSC as selection criteria, (5) continuing efforts to obtain and maintain training managers' and commanders' buy-in, and (6) organizing periodic meetings of ASLTE trainers and developers. These recommendations are likely to influence the way ahead for courses throughout the MCoE, initially, and potentially throughout the Army.

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REFERENCES

Anderson, J. R. (1983). *The Architecture of Cognition.* Cambridge, MA: Harvard Univ. Press

Carlyle, T. (1841). Hero Worship, & the Heroic in History. London, England: Levy, Robson, and Franklin.

Department of the Army (2011). The U.S. Army Learning Concept for 2015. *TRADOC Pam 525-3-0*. Ft. Monroe, VA: Training and Doctrine Command.

Dewey, J. (1938) Experience and Education. New York: Collier Books.

Duffy, T.M., & Kirkely, J.R. (2007). Experiential learning. Presentation at Redstone Arsenal, Huntsville, AL

Ericsson KA, Smith J. (1991). Prospects and limits in the empirical study of expertise. In Ericsson KA, Smith J. (Eds). *Toward a General Theory of Expertise: Prospects and Limits* (pp 1-38). Cambridge, England: Cambridge University. Press.

Fitts P, Posner MI. 1967. *Human Performance.* Belmont, CA: Brooks/Cole.

Holyoak, K. J. (1991). Symbolic connectionism: Toward third-generation theories of expertise. In K. A. Ericsson & J. Smith (Eds.), *Toward a General Theory of Expertise: Prospects and Limits* (pp. 301–336). Cambridge, England: Cambridge University Press.

Riccio, G., Diedrich, F., & Cortes, M. (Eds.) (2010). *An initiative in outcomes-based training and education: Implications for an integrated approach to values-based requirements*. Fort Meade, MD: U.S. Army Asymmetric Warfare Group.

Savery, J.R. & Duffy, T. (1995). Problem Based Learning: An instructional model and its constructivist framework. Educational Technology, 1995, 35, 31-38.

Schwartz, D.L., & Bransford, J.D. (1998). A time for telling. *Cognition & Instruction, 16*, 475-522.

Smith, E. M., Ford, J. K., & Kozlowski, S. W. J. (1997). Building adaptive expertise: Implications for training design strategies. In M. A. Quinones & A. Ehrenstein (Eds.). *Training for a rapidly changing workplace: Applications of psychological research* (pp. 89-118). Washington, DC: American Psychological Association.

U.S. Army Asymmetric Warfare Group (Unpublished Course Workbook). Implementing the Army Learning Model 2015. *U.S. Army Training and Doctrine Command*.

Zaccaro, S. J., LaPort, K., & Jose, I. (2012). Attributes of successful leaders: A performance requirements approach. In M. Rumsey, (Ed), *The Oxford handbook of leadership* (pp 11-36). Oxford, England: Oxford University Press.